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January 21, 1956

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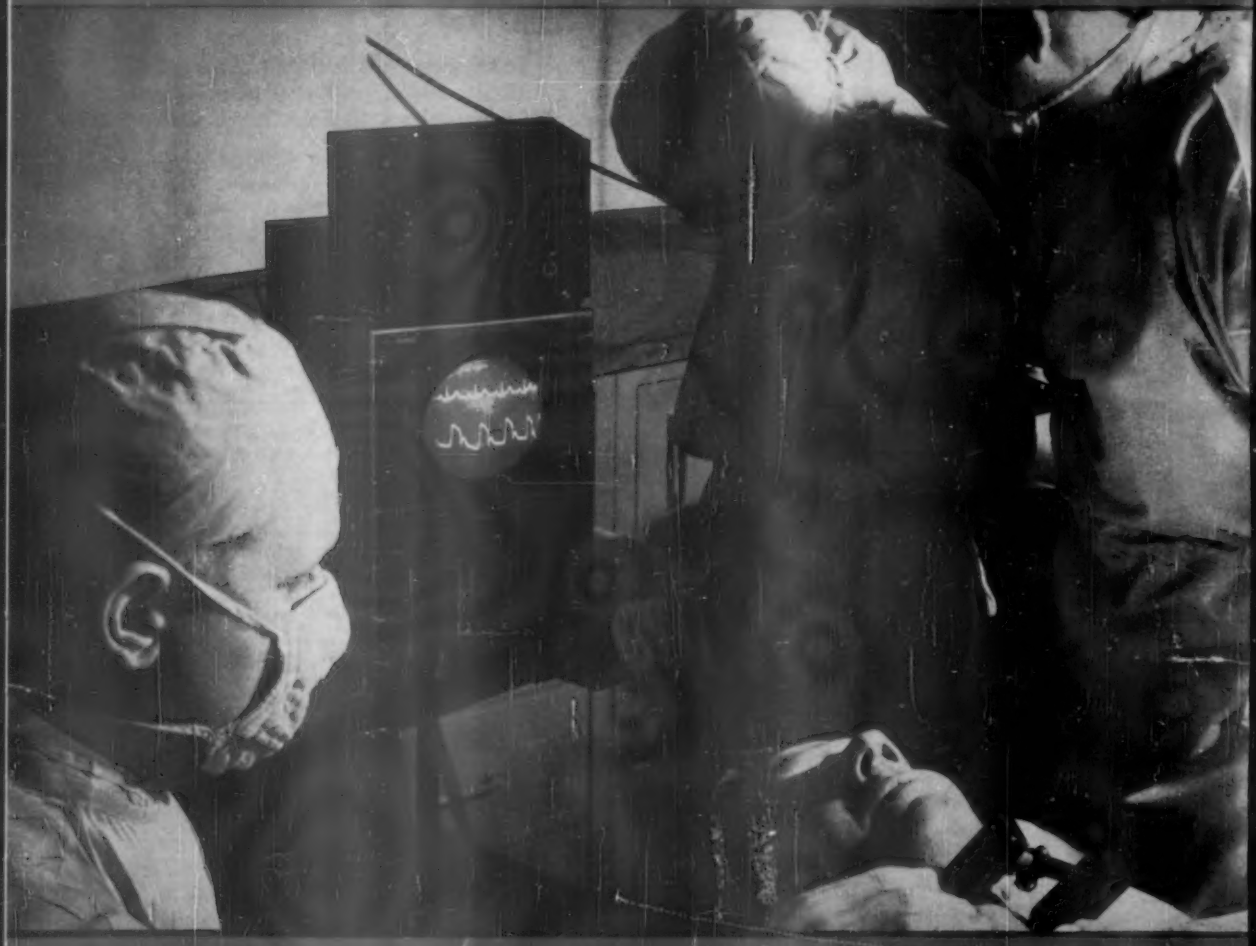
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Heart Surgery

See Page 41

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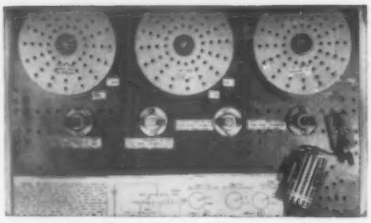

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AGRICULTURE

Atoms Vital to Agriculture

Applications of atomic energy to agriculture may prove to be as important to nation's economy as nuclear power. Using "tracers" already beneficial.

➤ THE NATION'S ECONOMY may get as big a boost from use of atomic energy in agriculture as it will from atom-generated electricity, Dr. Willard F. Libby, U. S. Atomic Energy Commissioner, told the Conference on Radioactive Isotopes in Agriculture at East Lansing, Mich.

Dr. Libby gave $210,000,000 as a "low" estimate of the potential savings to American agriculture each year by using atomic radiation.

Benefits farmers have already gained include knowledge about proper use of fertilizers found through experiments with radioactive "tracer" elements. With tracers, scientists learned that many plant nutrients are easily absorbed directly through the leaves of plants.

For some plants, fertilizer utilization through leaves may be as much as 95%, compared to only 10% if the same quantity of fertilizer is applied to the soil, Dr. Libby said.

Atomic radiation is expected to play a big part in food preservation in the future. Dr. Libby reported that the Department of Defense, with financial support from the AEC, plans to build a nuclear reactor especially designed for pilot-plant studies in the preservation of food by irradiation. The Defense Department expects to use some 1,000 tons of irradiated foods a month for various studies during the next two or three years.

The armed forces buy almost $2,000,000,000 of perishable foods each year, and refrigeration costs are estimated as $40 per man per year.

If preserving these foods by radiation can be achieved to the extent of cutting even one-fourth of this refrigeration cost, potential savings would be $20,000,000 per year with a 2,000,000-man army, Dr. Libby pointed out .

Oat-rust disease is estimated to reduce the nation's oat production 10% or more each year. Rust-resistant strains have now been developed by radiation-caused hereditary changes, Dr. Libby said, giving promise of potential savings of more than 125,000,000 bushels of oats a year, worth approximately $100,000,000.

Except for studies on one insect pest of livestock, no estimates have been made on potential savings from atomic energy in the livestock and livestock products industries, Dr. Libby said.

Therefore, he suggested that the present estimate of $210,000,000 a year savings in agriculture "may well be low rather than high."

Dr. Libby said it is "extremely doubtful" that radioisotopes will be used directly by a farmer to increase the crop yield. Knowledge gained by scientists about how a plant or animal grows, however, can be used directly by the farmer to tell him when it is best to apply fertilizer or to add certain nutrients to the feed of growing animals, Dr. Libby pointed out.

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PHYSICS

Fastest "Stop Watch" Times Atomic Events

➤ THE WORLD'S FASTEST "stop watch" for clocking the action of atomic particles has been developed at Westinghouse Research Laboratories.

Capable of timing atomic events taking less than one-billionth of a second, the stop watch is actually a photomultiplier tube.

It is so fast its top speed cannot be determined exactly until laboratory measuring instruments catch up with it. Calculations show it is probably ten times faster than the one-billionth of a second recorded.

The electronic stop watch, designed to aid nuclear studies, strengthens weak pulses of radiations and detects the time intervals between them, Dr. Clarence Zener, acting director of Westinghouse Research Laboratories, Pittsburgh, Pa., said.

It will be used to time the flight of speeding atomic particles.

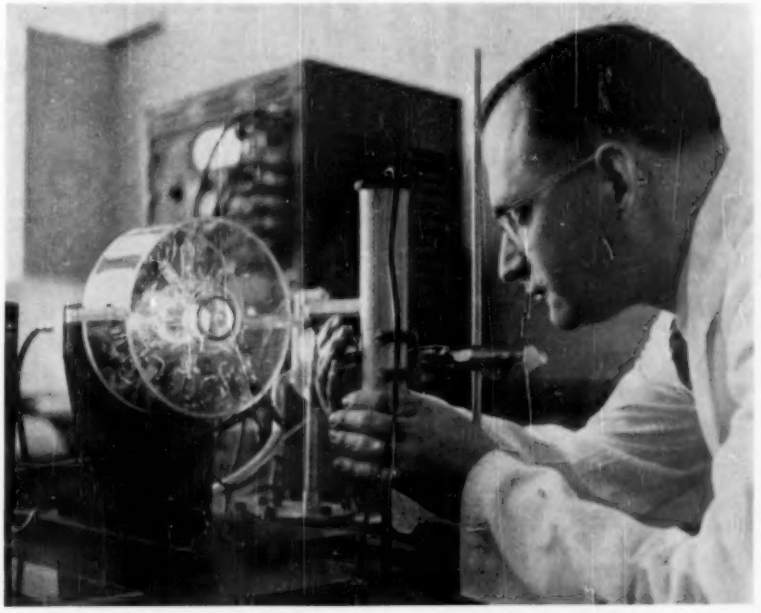
"It will permit us to measure, with a new order of precision, the speed, and therefore, the energy of atomic particles as they 'smash' into atoms and produce nuclear reactions, or as they are ejected from the atom during such reactions. This precision, we believe, will give us new insight into the causes and effects of nuclear reactions, and, perhaps, into the structure of the atomic nucleus itself," Dr. Zener said.

Electrons released by a radiation pulse entering the tube strike the front surface of an exceedingly thin non-metallic film, knocking free several more electrons, which then bombard a second film. After many such stages, several million electrons are obtained for each one initially released.

Conventional photomultiplier tubes use thick metal plates instead of thin films to obtain the extra electrons.

The tube was developed by Dr. E. J. Sternglass and Milton M. Wachtel, research scientists at the laboratories.

Science News Letter, January 21, 1956



TIMING ATOMS IN FLIGHT—This electronic tube, capable of timing successive flashes of light less than one-billionth of a second apart, is the world's fastest "stop watch." It has an improved type of photomultiplier tube, using cascading electrons ejected from very thin films. Dr. E. J. Sternglass, research scientist at the Westinghouse Research Laboratories, Pittsburgh, Pa., adjusts a source of radiation beamed into the tube.

METEOROLOGY

Fallout Patterns

➤ KNOWING which way the wind blows is not always helpful. At least not where deadly radioactive fallout is a factor, the Federal Civil Defense Administration warns.

Cautioning the public and civil defense personnel alike, the Administration reported that it is high altitude winds, up to 80,000 feet, that have the greatest effect on the direction of fallout. Surface winds, FCDA scientists point out, are no indication of the course radioactive fallout takes after an atomic or hydrogen bomb attack.

The government agency also warned that the "flat assumption that the fallout pattern is invariably in a west-to-east elliptical pattern" is wrong.

The "typical" west-to-east cigar-shaped pattern can easily be reshaped into a spilled-ink-like mass and blown in any direction, tests have shown. Although prevailing winds in the nation are west-to-east, they can blow the other way, particularly in the summer.

In issuing the warning, the FCDA reports that rain and snowfall would reduce the area of fallout, but at the same time, increase the concentration of radioactive particles in some areas.

At present, the U. S. Weather Bureau is issuing twice daily forecasts for all critical target areas on fallout direction and arrival time.

The civil defense officials included their warnings in a technical bulletin, "Fallout and Winds." In the bulletin, they list five rules-of-thumb about the subject:

1. Up to 40,000 feet, the prevailing winds are out of the west, particularly in the spring, fall and winter.

2. Strongest winds are usually found at 30,000 to 40,000 feet and these would determine the general direction and length of the pattern.

3. "Typical" wind direction varies more in the summer, especially in southeastern United States.

4. Above 60,000 feet, winds from the east occur frequently in all seasons.

5. Winds blow less constantly from the west along the Pacific Coast.

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PSYCHOLOGY

Young Scientists Studied

➤ THE talented young scientists of America are characterized by capacity, interest and freedom.

This is indicated by a survey of 600 who have won recent honors in the National Science Talent Search, conducted by Dr. Robert D. MacCurdy of the University of Florida, and reported to the American Association for the Advancement of Science in Atlanta.

In personality the outstanding young scientists show leadership, self-control, self-discipline, curiosity, persistence, and complexity of outlook, Dr. MacCurdy's study, done at Boston University, showed.

He found that they recognized the interdependence of science and society. They made their decisions to be scientists very early when they were in elementary school and they show their love of humanity through their participation in science.

Dr. MacCurdy's results were based on inquiries to two years of National Science Talent Search honor winners totaling 600. Based on the experience of earlier Science Talent Search winners over 15 years, 93% of them will become scientists and engineers.

"Scientific manpower is the product of a long process of educational experience," Dr. MacCurdy said. "Career choices are made at a very early age and the peak of productive efficiency is under 35 years of age. Scientists must be identified when very young and provided with an environment that will encourage science development in a few years."

Youngsters who seem to have promise as scientists-to-be show high drive and a tendency to introversion, Paul Brandwein of Forest Hills High School, N. Y., told the scientists. There are discernible periods of incubation and illumination which seem to be characteristic of the way these young people work.

The teacher who is successful in working with young scientists, aside from his superior training and wide interests, also serves as a father or mother image, he has found.

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PHYSICS

Slimmer Particle Tracks In Cloud Chambers

➤ RELIABLE MEASUREMENTS can be made of both the mass and energy of cosmic ray particles slicing through a cloud chamber for the first time by means of a method developed by Drs. William B. Fretter and E. W. Friesen, University of California physicists.

High-energy charged particles passing through cloud chambers leave tracks formed from droplets of condensed air.

Scientists count the droplets to determine the velocity, or energy, of the particles, using a magnetic field to separate the positive from negatively charged droplets. The track's curvature caused by the magnetic field indicates the particle's mass.

Measurement of both energy and mass simultaneously has been virtually impossible because the curved track becomes distorted.

The Berkeley scientists modified the cloud chamber to use helium instead of air. Since helium atoms each have only two electrons to be knocked off by cosmic ray particles, the track of droplets is thinner. No electrical field is needed to separate negatively from positively charged droplets, and the track's distortion is eliminated.

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TECHNOLOGY

Iron Exhibit Shows Industrial Growth

➤ ELI WHITNEY'S 1808 musket that introduced interchangeable parts manufacture basic to American industry is one of the prime specimens in the new iron and steel exhibit accepted for the government from Bethlehem Steel Company by Dr. Leonard Carmichael, secretary of the Smithsonian Institution.

Iron tools, weapons and household objects found in excavations at Jamestown, Va., links of the massive iron chain placed across the Hudson during the Revolution to bar the British fleet, the original converter of William Kelly that made steel cheap and widely used, and scale models of the Saugus ironworks dating from 1647 are also contained in the exhibit to be seen by the millions who visit Uncle Sam's museum.

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TECHNOLOGY

Only Ten Minutes To Master Army Radio

➤ TEN MINUTES is the time needed for a soldier to learn to operate the Army's newest combat radio, designed to replace transmitter-receivers used as recently as the Korean War.

A total beginner, its developers reported, needs to know only which knobs to turn and when. The radio does the rest by automatically tuning itself and its antenna.

Four times more powerful than other models now in use by the Army, the AN/GRC-19, as it is called in military language, can be air-dropped and set up in a matter of minutes to transmit messages from front lines to rear areas over as much as 2,000 miles.

In addition, the radio can:

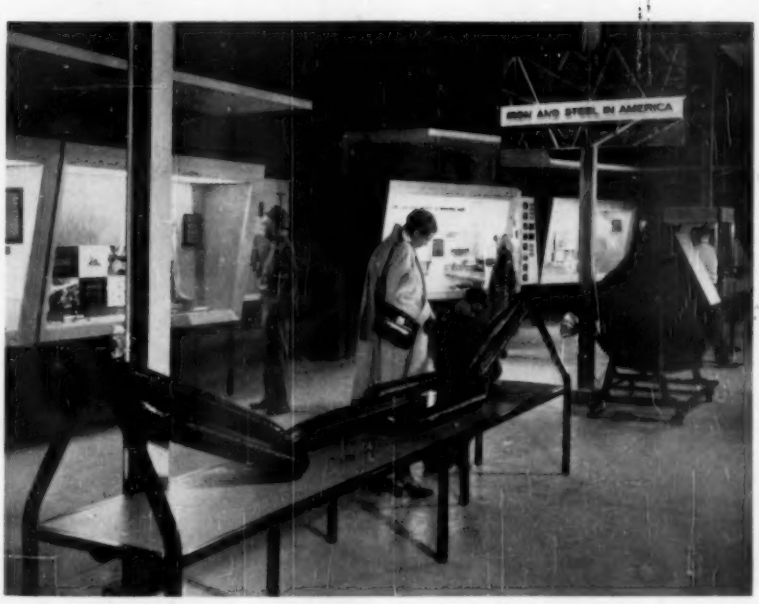
1. Transmit and receive messages over mountains and other barriers without relay radios.
2. Send and receive at the same time both voice and radio teletype messages.
3. Be remotely controlled from up to 75 feet away.
4. Be repaired simply by removing a defective part and plugging in a new one.
5. Operate in temperatures from minus 40 to plus 149 degrees Fahrenheit, in rain, sleet or snow.

The new radio has seven channels preset as in push-button models. An operator switches to the one he wants, presses his microphone button and talks.

Stability has been so greatly improved, the Army engineers reported, that crystals are no longer needed to keep the set tuned to a channel.

Engineered for reconnaissance cars, tanks and jeeps, the radio was developed by engineers at the Army Signal Corps Engineering Laboratories, Fort Monmouth, N. J., and the Collins Radio Company, Cedar Rapids, Iowa.

Science News Letter, January 21, 1956



NEW SMITHSONIAN EXHIBIT—The history of iron and steel development in the United States is portrayed in the new exhibit now on display at the Smithsonian Institution. In foreground are links of chain thrown across Hudson River to check the British fleet. In background is the original tilting-type Kelly converter, forerunner of the bessemer process in the U. S.

CYTOLOGY

Photograph "Hot" Proteins

➤ THE FIRST photographic evidence showing how protein, the basic stuff of life, may be manufactured has been obtained by two University of California scientists.

The research required delicate surgery on amoebae, tiny single-celled creatures that measures only one-and-a-half-hundredths of an inch across. Radioactive nuclei, or "hearts," were transplanted from one amoeba to another.

Scientists long have accepted the idea that the nucleus of the individual living cell directs the cell's functions, including the manufacture of proteins. Ultimately, the cell nucleus holds sway over the function of every organism, including man.

Essentially, the Berkeley work strengthened the theory that a complex chemical substance, ribonucleic acid or RNA, is produced in and transmitted from the nucleus into the cell fluid or cytoplasm, where RNA influences the manufacture of protein molecules.

The Berkeley scientists, Drs. Lester Goldstein and Walter S. Plaut, obtained a series of striking photographs using radioactive phosphorus and photographic emulsions.

When amoebae had absorbed radioactive phosphorus and were placed on an emulsion, the location in the amoeba of the "hot" atoms was marked. This is called an autoradiograph.

The work showed radioactive phosphorus had become concentrated in the nucleus and had been incorporated into RNA molecules in the nucleus.

In separate experiments, the scientists performed the surgery. They removed the nucleus, or "heart," of an amoeba, then maneuvered it alongside another amoeba having a radioactive nucleus. The "hot" nucleus was next pushed with a tiny probe into the enucleated cell. This nucleus is about two-and-one-half-thousandths of an inch in diameter, and the operation was perfected only after several months of work.

The scientists found that, when cells were allowed to live for about 12 hours after the operation, "hot" RNA molecules had been transmitted randomly throughout the cell.

Finally, the scientists demonstrated that RNA molecules are not transmitted from the cytoplasm into the nucleus. Moreover, there was no evidence of the "hot" RNA being broken down in the cell fluid, thus indicating it is used in laying down protein molecules.

The work by Drs. Goldstein and Plaut, reported in the *Proceedings of the National Academy of Sciences*, was supported by the American Cancer Society and the U. S. Public Health Service.

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ANTHROPOLOGY

Texans Are Different

"Texans" are found to be a special people, not confined to limits of the Lone Star state, but spread throughout southern United States.

➤ THE TEXANS are right. They are a special people. Confirmation of what any Texan could tell you, and often does, comes from Dr. Evon Z. Vogt, anthropologist of Harvard University, Cambridge, Mass.

The "Texans" are what Dr. Vogt calls a "subcultural continuum," and he puts the "Texans" in quotes because they are not really confined to Texas. They are spread over the country from the southern Appalachians to California, south to the Mexican border and north to southern Ohio, Indiana, Illinois and Missouri.

The Mormons are another subcultural continuum, which Dr. Vogt believes carry "with them a variant form of American patterns and values which make them more than merely a church group."

Both the "Texans" and Mormons were studied as subcultures of the American society by Dr. Vogt and his associates during the last six years.

The Harvard anthropologist reports results of the study by 30 field researchers, part of the Comparative Study Values in Five Cultures Project of the Laboratory of Social Relations at Harvard, in the *American Anthropologist* (Dec., 1955).

What the intensive study shows is that the "Texans" are very different from the Mormons, forming in many ways a complete contrast. But, they are alike in a few ways, too.

In broad terms, this is what Dr. Vogt and his associates found concerning the cultural patterns of the two American groups. Both Mormons and "Texans" speak English, but have little command over other languages. The "Texans" and rural Mormons both like "hillbilly" music. They also both share a belief in many agricultural folk rituals such as "water witching," and "planting by the moon."

The differences are striking, Dr. Vogt suggests. The Mormon places emphasis on cooperation and contributions to community activities, while the "Texan" is seen as a competitive individualist and is characterized by a great deal of "fussin'" and "feudin'."

A second important difference, Dr. Vogt points out, is that the Mormon is a great one for steady work habits. When he has no work to do for himself, it was found, there is always work for the church.

The "Texan," on the other hand, believes in working hard when there is important farm work to be done, then "loafs hard" the rest of the time.

Essential characteristics of the "Texans," Dr. Vogt explains, appear to have been created by a westward migration of predominantly old American stock from the southern Appalachian country of Virginia, North Carolina, Kentucky, Tennessee, Alabama, and Georgia, across the Ozarks and on to Texas and Oklahoma.

"The orientations of these two subcultures to other groups in the South and West are quite different," Dr. Vogt reports.

"Neither Texans nor Mormans as a rule care to have much to do with Negroes, the Texans because of their familiar Southern attitudes toward the Negro, the Mormons for their theological reasons . . ."

The "Texan" attitude toward Spanish-Americans, Mexicans and Indians with whom he comes into contact in the Southwest is usually strongly colored by the definition of them as "dark-skinned" peoples.

Particularly with the Mexicans, "Texans" are likely to take, Dr. Vogt states, the "Remember the Alamo" type of attitude.

The Mormons have a special attitude toward dark-skinned peoples, the study shows. They call American Indians "Lamanites." The Lamanites are defined by the Book of Mormon as descendants of the ancient Hebrews. The darkening of their skin is believed due to desertion of their principles and a return to God will turn it white again. Hence, the Mormons make a special effort to convert the Lamanites.

Negroes, on the other hand, are believed to be descendants of Cain. Thus the dark color of their skin is considered a "curse."

The descendants of Cain cannot be saved, according to the Mormons, until after all the descendants of Abel are saved, and so at present it is useless to try to convert Negroes.

To the Mormons, all Mexicans, Spanish-Americans and Indians are Lamanites.

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NUTRITION

Urge Eliminating All Deficiency Diseases

➤ DR. ROBERT R. WILLIAMS of the Research Corporation, New York, who synthesized vitamin B-1, challenged scientists at the American Association for the Advancement of Science meeting in Atlanta to wipe out all the world's major deficiency diseases, except Kwashiorkor due to amino acid lack. It could be done by fortifying cereals and table fats at an outlay for vitamins of 25 cents per person per year, he said. Dr. Williams is pushing the enrichment of rice in the Philippines to eradicate beriberi and the enrichment of corn meal in southern U.S.A. and Yugoslavia to eradicate pellagra.

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PSYCHOLOGY

Anti-Fluoridation Groups Opposed Chlorination

➤ THE SAME GROUPS that now oppose fluoridation of water supplies were a few years ago fighting by vicious propaganda the chlorination of drinking water that has now virtually banished typhoid, Robert S. Ingols of the Georgia Institute of Technology told the American Association for the Advancement of Science meeting in Atlanta.

Although almost everyone proposing fluoridation to prevent dental decay in children's teeth is vilified by being called a Communist here in America, it is the Communists in Europe who bitterly oppose fluoridation as a capitalist device.

Do not worry about the ultimate exhaustion of raw materials like coal, oil and gas, since every chemical known to man and every one likely to be invented, could if necessary be produced without them, George L. Parkhurst of the Standard Oil Company of California told the scientists.

Length of day regulates the germination of seeds as well as the flowering of plants, Dr. Olli Vaartaja, forest biologist of the Canadian Department of Agriculture, Saskatoon, reported. Birch seed in particular at relatively low temperatures, from 42 to 68 degrees Fahrenheit, will not germinate unless exposed to long daily light. This prevents freshly fallen birch seed from germinating until spring when the nights become short, whereas otherwise the tiny seedlings would perish when winter comes.

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ANIMAL NUTRITION

Change Steers Into Fat-Eaters

➤ GRASS-EATING Hereford steers have been made into fat-eaters by scientists of the Stanford Research Institute, Menlo Park, Calif.

The experimental herd had 2.25% animal tallow added to their regular grain ration, resulting in increased weight gain, improved feed efficiency and savings in cost of producing the gain, they said.

Melted animal fats were sprinkled over the cattle's grain ration in the feed trough during the 91-day experiment, then mixed thoroughly with a multi-pronged fork.

Stanford Research Institute performed the study for some West Coast meat packing and fat-rendering companies alarmed at the mounting surplus of fats and tallows. In 1953, the surplus amounted to more than 1,000,000,000 pounds.

The oversupply is due largely to increased use of detergents, which has cut sharply into the demand for fats and tallows in soap-making.

According to the Institute, synthetic detergents took 58% of soap sales in 1954, and it is predicted this figure will climb to 75% by 1962.

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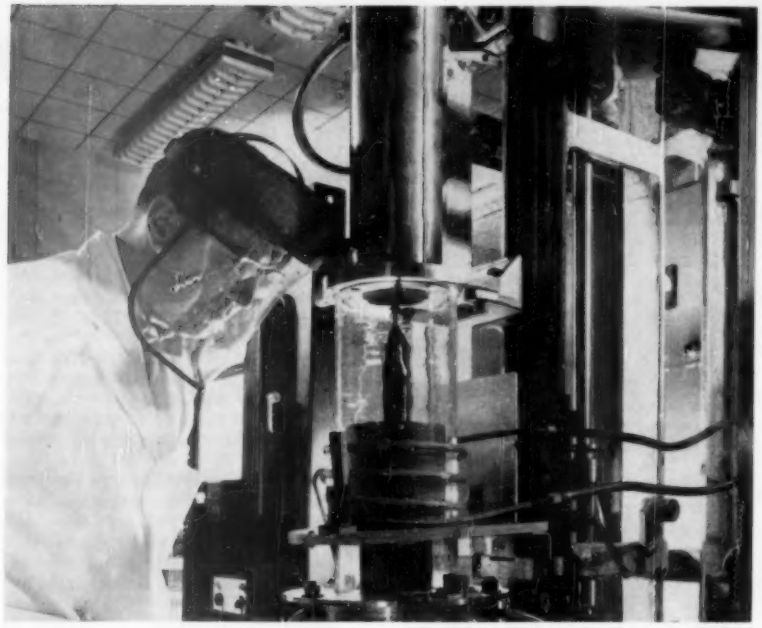

LARGE GERMANIUM CRYSTAL—A large crystal of germanium is shown here being grown in the center of the quartz housing in the semiconductor physics laboratory of Delco Radio Division, Kokomo, Ind. In about five hours, the crystal will be about 11 inches long and one and a half inchs thick, valued at more than $3,000.

CYTOLOGY

Find Graft Chemical

➤ DISCOVERY of ES, a substance that breaks the barrier to transplantation or grafting of tissues from one body to another, was announced by the American Cancer Society.

The discovery was made by Dr. George D. Snell and associates at the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me. ES, for Enhancing Substance, was found in mouse blood and tissue. When ES was injected into mice, tissues then transplanted to the mice survived and grew, although without ES injections, the mice invariably produced antibodies which destroyed the transplants.

ES has implications for many clinical uses but, in the fundamental research center at Bar Harbor, no studies on humans will be made.

Although the Bar Harbor research was done almost exclusively on mice, scientists elsewhere have made similar observations in other animals and in humans that support the belief ES may be a universal mechanism in immunity.

Every individual produces a different kind of ES, possibly as distinctive as his appearance and abilities. ES from one person would not establish a tolerance for another person's tissues or cells.

ES, the Bar Harbor group has learned in mouse studies, is manufactured in cells under the direction of a certain cluster of genes on the ninth chromosome. Weaker forms of ES may be made by still other gene clusters. Several steps are involved in the manufacture of ES, and the genes operate like chemists on an assembly line in compounding it.

ES seems to be able to tie the hands of lymphatic and other tissues that manufacture antibodies.

ES is present in tumors and in many normal tissues. Red blood cells and spleen are particularly rich sources of it. It has been extracted from tumors in partly purified form and been shown to consist of at least two parts, one a protein and the other a carbohydrate.

One of the problems under exploration is the role of ES in cancer. The scientists are trying to determine whether the presumably strange cancer cells produce ES that enables them to grow in the host.

Several strains of mice have been treated with ES from tumors to which they normally are resistant; and in each case ES made the mice tolerant of the tumor, which then grew and killed them.

AGRICULTURE

Plasma Substitute Is Soil Conditioner

➤ CHEMICALS that give new life to ailing humans can be used to give new life to ailing soil, a report in the *Journal of Agricultural and Food Chemistry* indicates.

Dextrans, chemicals used as blood plasma substitutes, act as soil conditioners and as a source of nitrogen, phosphorus and potassium for plant growth when mixed with soil, Dr. Leo J. Novak, E. E. Witt and Malvern J. Hiler of the Commonwealth Engineering Company, Dayton, Ohio, reported.

Boosts in plant growth of as much as 70%, increases in seedling emergence up to 44% and marked improvement in soil stabilization resulted in tests with dextrans, the scientists reported. In their trials, they used about one and a half ounces of certain dextrans per square foot of garden soil, mixed to a depth of four inches.

Made from sugar, dextrans are relatively economical soil conditioners. The well-drained granular condition of fertile virgin soils is partly due to the presence of natural dextrans, synthesized by bacteria in the soil, the scientists said.

ARCHAEOLOGY

3,000-Year-Old Bathtub Discovered in Greece

➤ A BUILT-IN bathtub more than 3,000 years old was found near Pylos, Greece, and is evidence to the luxury in the ancient palace of heroic King Nestor, Dr. Carl W. Blegen of the University of Cincinnati reported to the Archaeological Institute of America in Chicago.

A drinking cup found on the floor of the tub made Dr. Blegen wonder "if it was the custom in the palace to drink wine while being bathed."

The tub consisted of an under-container of clay and perhaps crude brick into which had been set a terracotta inner tub with three or four handles.

The tub was decorated inside and out with painted patterns.

Not only did King Nestor have the convenience of a built-in bathtub, but the used bath water was carried away by a drain. In fact, rain water from all the broad roofs and the court yards was also carried off by an elaborate system of drains.

"Each court so far examined," Dr. Blegen said, "has revealed in some place a depression in the floor, where a perforated stone slab allowed water to run down into a underlying drain."

The southwesterly part of the palace was drained by several small branch channels emptying into a main tunnel that discharged into the low ground beyond the steep southwestern edge of the site, Dr. Blegen reported.

GENETICS

Crippled Mice Seen Aid in Muscular Dystrophy

➤ CRIPPLED, humpbacked mice may speed the conquest of a crippling, fatal disease of humans, muscular dystrophy.

The mice suffer from the same ailment in hereditary form. They are apparently the first experimental animals of known hereditary background to suffer this particular muscular disease.

They were discovered at the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me. This laboratory is world-famous for the standardized inbred strains of mice it supplies to more than 500 research laboratories in the United States and 23 foreign countries.

The dystrophic mice are considered so valuable as a tool for research on this incurable disease that the Muscular Dystrophy Associations of America have granted $50,000 to Jackson Laboratory for continued study of the strain and production of more muscular dystrophy mice for study at other laboratories.

Discovery of the mice, reported in the *Proceedings of the National Academy of Sciences*, (Dec. 1955), dates back to 1951, when Dr. Elizabeth S. Russell of Jackson Laboratory found a few small, weak-looking animals in her colony of inbred mice of strain 129.

These mice did not leave any descendants, but their relatives frequently produced similar small, weak mice that showed muscular incoordination, then paralysis and humpbacks.

Further study of the mice was made by Dr. Russell, Miss Ann Michelson, who came from Smith College as student apprentice at Jackson Laboratory, Dr. Pinckney J. Harman, visiting investigator from New York University Medical School, New York, and Dr. Leroy C. Stevens Jr. of the Laboratory.

Dr. Stevens transplanted ovaries from dystrophic mice to healthy mice in order to perpetuate the strain for research.

This team succeeded in pinpointing the defect in muscles but not in nerves of mice, which is the characteristic of the disorder in humans. By breeding experiments, they found that in the mice the condition is caused by the direct action of a single mutant autosomal gene. The gene's full recessive expression of 25% is obscured by several factors to a maximal average of 21%.

Science News Letter, January 21, 1956

BIOLOGY

Discover Sense Organ In Mosquitoes' Heads

➤ MOSQUITOES have more sense than scientists have credited them with up to now, or at least they have more "senses."

Dr. M. F. Day, Australian entomologist presently acting as scientific liaison officer of his nation in Washington, told Science Service that he has discovered a new sense organ in the head of mosquitoes and closely related flies.

The paired organ, located between and just above the antennae, probably has to do with the detection of changes in pressure around the insect, Dr. Day speculated, though this has not been proved yet. Dr. Day suggests the name "tambour organ" for the newly-found structure.

Does the tambour organ increase the mosquito's efficiency in finding and biting humans? Probably not, said Dr. Day, since the mosquito has a battery of well-known sense organs that are quite enough to take care of that matter.

For example, there are organs that detect radiant heat to let the mosquito know it is near warm-blooded prey, there are moisture-detecting and carbon-dioxide-detecting organs, as well as organs of sight and smell.

Assuming the tambour organ detects changes in pressure, how might that benefit the mosquito? It might act something like an air speed indicator for the flying insect, said Dr. Day. The wind pressure encountered while flying at different speeds might be registered by the organ, giving the insect a measure of his speed.

But this is guesswork, the scientist added. Actually the organ is so small and so little studied that there is not much fact to go on. In most of the species in which it is present, it is so small that it cannot be dectected externally even with a microscope. Only among some of the very large "daddy-long-legs" flies (Tipulidae) can the organ be spotted relatively easily.

Dr. Day said he has found the tambour organ only among the more primitive of the two sub-orders of two-winged insects (Diptera). The higher group, which includes the common house fly, apparently does not have the organ, and there is nothing quite like it in any other insect group to his knowledge, Dr. Day said.

Dr. Day reported his research in detail in the Australian Journal of Zoology (Oct. 1955), while attached to the Commonwealth Scientific and Industrial Research Organization in Canberra.

Science News Letter, January 21, 1956

MEDICINE

Moderate Drinking Clumps Red Blood Cells

➤ DRINKING, even moderate drinking, alcoholic beverages makes red blood cells stick to each other in clumps, instead of repelling each other to flow separately through the small blood vessels as they do in normal, healthy persons.

The finding, by Dr. Heikki Suomalainen and O. Forsander of the State Alcohol Monopoly research laboratories, Helsinki, Finland, is reported in the *Quarterly Journal of Studies on Alcohol* (Dec., 1955).

Clumping of red blood cells can be injurious, since it can slow the blood stream speed, with consequent decrease in oxygen supply to the tissues. Whether or not the clumping after moderate alcohol drinking is injurious is not stated by the Finnish scientists.

Science News Letter, January 21, 1956

IN SCIEN

PSYCHOLOGY

Poorly Adjusted Less Disturbed by Noise

➤ YOU MAY think that a loud irritating noise when you are trying to work will drive you crazy, but actually being maladjusted may help you work better if it is noisy.

This was learned in a study of students at the University of Oklahoma conducted by Drs. Edmund V. Mech and Henry Angelino and reported by them to the American Association for the Advancement of Science in Atlanta.

It is only the exceptional person these days who can work free from such noises as the neighbors' radios and televisions, children shrieking at play under the window, blaring auto horns, the blast of exhausts, the crash of fenders, and aircraft flying low overhead.

Some people are irritated or distressed by such noises. Others are not affected.

An experiment showed that a group of students who scored on a personality test as having "low" adjustment worked significantly better in loud noise than did another group with "high" adjustment.

Science News Letter, January 21, 1956

CHEMISTRY

Find Fungi That Synthesize Rubber

➤ FUNGI that can manufacture rubber have been discovered by a team of scientists with the B. F. Goodrich Company at Brecksville, Ohio.

The scientists report in *Science* (Dec. 30, 1955) that they have isolated and identified rubber in material extracted from species of the fungus organisms *Lactarius* and *Peziza*.

Forms of mixed species of *Lactarius* contained, on a dry-weight basis, 1.7% of a substance that on analysis proved to be cispolyisoprene, a rubber polymer. Analysis with infra-red light showed the rubber to be nearly identical with that from the Hevea rubber tree.

Rubber extracted from forms of *Peziza* fungi was much tougher than that from *Lactarius*. This rubber is probably cis-polyisoprene, too, they said.

Since fungi are considered offshoots from the algae on the evolutionary family tree, it is probable that some algal species may by synthesizers of rubber, report W. D. Stewart, W. L. Wachtel, J. J. Shipman and J. A. Yanko.

Mr. Stewart and Mr. Wachtel are now with the Atlantic Research Corporation, Alexandria, Va.

Science News Letter, January 21, 1956

CE FIELDS

ENTOMOLOGY

Pakistan Insect Brought To Florida for Pest Control

➤ AN INSECT from Pakistan has been introduced into Florida in the war against destructive insect pests, reports the U. S. Department of Agriculture.

The newcomer is a lady beetle, *Brumus suturalis*, imported from Pakistan because of its healthy appetite for aphids, mites, some scale insects, mealy bugs and a host of other citrus and vegetable pests.

This lady beetle is one of several beneficial insects turned up by the USDA's insect explorer, George W. Angelet, during a hunt in India and Pakistan in 1953-54. Mr. Angelet is presently in the Far East, looking for natural enemies of an alfalfa-destroying aphid doing serious damage in the southwestern U. S.

So far, 19 batches of *Brumus* have been released in Florida in citrus groves that are not being sprayed with insecticides. Where possible, Temple orange and tangerine groves were selected, as these furnish a better supply of aphids for the lady beetles to feed on while they are becoming acclimated.

The first successful introduction of foreign insects to control pests took place in California in 1888, the USDA said. At that time, the California citrus industry was threatened by the cottony cushion scale, a native of Australia, and growers in despair were preparing to remove their trees. But back in Australia, natural enemies had long kept the scale in check.

The USDA sent an entomologist "down under" to search for these natural enemies. He returned with the most important insect enemy of the scale, and 18 months after its introduction, the beneficial insect had practically cleared California of the scale.

Science News Letter, January 21, 1956

GENERAL SCIENCE

Youth Science Hits Record in Interest

➤ MORE HIGH SCHOOL seniors have shown interest in scientific research careers this year than ever before.

Completed entries in the Fifteenth Annual Science Talent Search for the Westinghouse Science Scholarships hit an all-time high of 3,375, contrasted with 2,575 last year, an increase of 31%.

Number of examinations requested by teachers and school officials for administration in December, 1955, also reached a new high, with 20,828 examinations sent to 2,959 teachers.

Completing the very stiff science aptitude test and finishing the science project that must be performed and reported are considered to be hurdles in picking the nation's top young scientists. Only one in six of the seniors who planned to enter the Science Talent Search actually completed their entries.

Judges are now selecting 300 finalists from the completed entries. Forty of these, eight girls and 32 boys, will be invited to come to Washington for the Science Talent Institute, March 1 to 5, at which $11,000 in Westinghouse Science Scholarships will be awarded.

The 40 and an additional 260, who receive honorable mention, will be recommended to the leading colleges, universities and technical institutes of the nation for scholarships. Those who need assistance are awarded scholarships by educational institutions so they may go to college.

All who complete entries in the national contest are recognized by state Science Talent Search committees in 30 states. Many thousands of dollars are awarded by state committees; one typical state, Indiana, provided $85,000 in scholarships in one year.

Greater awareness by youth of the need for scientific creative ability in the nation's future is credited by Watson Davis, director of SCIENCE SERVICE, as the main cause of the increased participation in the Science Talent Search. Enrollments in high schools have not increased to the extent of interest in science as measured by the Science Talent Search.

The Science Talent Search, an annual affair, is conducted by Science Clubs of America, a SCIENCE SERVICE activity. It is financed by the Westinghouse Educational Foundation.

Science News Letter, January 21, 1956

PSYCHIATRY

Suggest Establishing Relaxing Drug Clinics

➤ RELAXING DRUG clinics for patients who have recovered and been discharged from mental hospitals are needed, Dr. Werner Tuteur and staff psychologist David Lepson of Elgin (Ill.) State Hospital declared at the meeting of the American Association for the Advancement of Science in Atlanta.

A special clinic for such patients who have been discharged from the Elgin institution has already been set up with the aid of Dr. Otto L. Bettag, director of the Illinois Department of Public Welfare, and Dr. Daniel Haffron, superintendent of Elgin State Hospital.

A combination of two tranquilizing drugs, chlorpromazine and reserpine, has been used with considerable success for patients at Elgin. The combination seems to be better than either drug used alone, and less of each can be given.

When the patient goes home, he remains improved because the hospital dispenses these drugs in the necessary combination.

Science News Letter, January 21, 1956

SURGERY

Instrument Recorder For Heart Operations

See Front Cover

➤ AN IMPROVED instrument that registers bodily events during heart surgery, and can aid surgeons and anesthesiologists in all operations, has been developed at the National Heart Institute, Bethesda, Md.

In difficult heart surgery, it is often desirable to monitor such delicately balanced variables as a patient's blood pressure and electrocardiogram. Sometimes a sharp drop in blood pressure or a series of abnormal deflections in the electrocardiogram can have vital meaning to the surgeon. Both events, therefore, are watched continuously and simultaneously throughout the operation for warning signs.

The usual device for following both events is a cathode-ray oscilloscope displaying two separate beams, one to trace the blood pressure curve and a second to trace the electrocardiographic curve across the face of the screen. These oscilloscopes are expensive, often bulky, and rather difficult to operate because of an excessive number of controls.

F. W. Noble, Dr. B. R. Boone, N. McC. Garrahan and R. E. Gorman of the National Heart Institute, Public Health Service, U. S. Department of Health, Education, and Welfare have now developed a modification of this instrument that reduces all these disadvantages.

The result is an inexpensive, compact and easily operated electronic switch that makes possible the adaptation of all existing single-beam oscilloscopes to perform like more complex double-beam instruments.

The switching process continues indefinitely, leaving behind two separate and distinct tracings. It is described in *The Journal of Laboratory and Clinical Medicine* (Sept., 1955).

The switching device is shown in use in the photograph on the cover of this week's SCIENCE NEWS LETTER. The electrocardiograph is the top curve and arterial pulse is the bottom curve.

Science News Letter, January 21, 1956

VIROLOGY

Virus Diets Include Sugar and Proteins

➤ INFLUENZA viruses like sugar, even if the sugar is not sweet.

Some other viruses go for vitamins or for metals such as copper.

Many viruses contain fatty chemicals, indicating perhaps a fatty kind of diet.

All viruses need proteins such as those found in the nucleus of every cell.

Virus diet needs were described by Dr. James V. Moulder of the University of Chicago at the meeting of the American Association for the Advancement of Science in Atlanta.

Science News Letter, January 7, 1956

TECHNOLOGY

Solar Heater for Arctic Desert

Heat concentrator using brilliant sunlight direct and reflected from snow could operate seven months of the year, saving many barrels of oil now airlifted to Arctic.

By HELEN M. DAVIS

➤ DESERT DWELLERS in one of earth's greatest waste-lands, at the top of the world, on the Greenland ice cap, look to the sun's abundant but as yet unharnessed energy as the only practical means of solving their living problems.

In other sun-baked desert areas, experimental building of solar heating devices lags because even five dollars capital investment in a pilot model seems high to the people living there. But people living in this northernmost of the earth's deserts want solar heaters now, no matter what they cost. They are not Eskimos, but Americans, to the number of a small ship's company, who live 200 miles out on the ice cap in Uncle Sam's "City Under the Ice."

At the "City Under the Ice," the Snow, Ice and Permafrost Research Establishment of the U. S. Army Engineer Corps, known in government circles as SIPRE, has maintained a research station for two summers in order to learn more about the true conditions in this frozen desert at the top of the world. The station is staffed with about 25 scientists each summer.

All Fuel Flown In

Fuel oil must be flown in to maintain practical living conditions for the little band of research workers who are exploring one of earth's last outposts, but only 25 barrels of oil can be brought in as one plane load. The oil is brought from Thule, a three-hour round trip, and a hundred round trips a year are required to bring the necessary fuel.

The cost of such airlift operations has been estimated at $2,000 per hour. Any way to lessen such fuel costs by using the sunshine that pours down abundantly during the 24-hour summer days and the long "twilights" of the spring and fall is economical, no matter what it costs.

"We use enormous amounts of fuel just to keep the domestic water supply liquid," Dr. R. W. Gerdel, chief of the climatological and environmental research branch of the Research Establishment, said, explaining that air temperatures at the Greenland station never go higher than 25 degrees Fahrenheit in summer and may go down to minus 65 degrees in winter.

Dr. Gerdel, whose laboratory in the temperate zone is at Wilmette, Ill., attended the Conference on Solar Energy at Tucson, Ariz., where he reported on peculiarities of the arctic climate that make the readings of instruments built for temperate climates misleading when they are taken north of the Arctic Circle.

Dr. Gerdel went on to the World Symposium on Applied Solar Energy at Phoenix, Ariz., to look over the solar energy heaters and batteries displayed there.

In his opinion, money should be no object in developing a pilot installation in the arctic, since any device that will work will be a money saver and a solution to one of the most serious difficulties to life in the far north.

Scoffing at the common belief in "the" long arctic night," Dr. Gerdel said that at 78 degrees north latitude sunset occurs about Oct. 31, but sunrise follows on Feb. 15. These dates are preceded and followed by a "twilight period," but the sun shines 24 hours a day in May, June, July and August.

In March and April and again in September and October the sunshine averages nine hours per day. Amount of snowfall is equivalent to only five inches of rain per year, which is less than falls in the Mojave Desert.

The precipitation, in the form of snow, may pile up to 30 or 40 inches. In winter the air may be full of blowing snow, representing new layering rather than fresh precipitation.

Fog-like conditions, known as white-outs, occur in summer, but the reflection of the sun even then makes dark glasses necessary. Some way to concentrate this abundant light, even though inefficiently, would be welcomed in this "land of the midnight sun."

Although the year's snowfall is not great in Greenland, on the 700,000-square-mile ice cap, the snow never melts and runs off. Layers of alternate summer and winter snow can be distinguished when digging down through the accumulated drifts of centuries.

A group from Dr. Gerdel's organization, in one excavation, counted down to the snowfall that occurred the year Lee surrendered. Alternating "mild" summers

MIDNIGHT SUN—Energy beams down on the Joint Arctic Weather Station at Mould Bay, Greenland, where the sun sets in October and rises in February. Ways to utilize the vast solar energy resource of the arctic's 24-hour summer days are sought by the Snow, Ice and Permafrost Research Establishment of the U. S. Army Engineer Corps, known as SIPRE, which maintains a staff of scientists each summer at arctic laboratories.

and "hard" winters leaves their records, much as tree-rings in warmer climates trace the record of past seasons.

Seismic soundings taken like those for oil prospecting determine the depth of the huge snowbank that is interior Greenland. Rising 2,000 feet in the first 50 miles above the narrow coastal shelf at sea level, in a steep escarpment, the top of the so-called ice cap has been found to be about 10,300 feet above its base. The base at the "City Under the Ice" near 7,000 feet above sea level lies in a basin now 300 feet lower than the shore line.

Snowcap Is Relic

Greenland's snow cap is an archaeological relic. On the northern part of the ice cap there appears to be more accumulation of snowfall today than there was 100 years ago, or even 50 years ago.

There does not seem to be any recession of the Ice Age in that part of the world, and this relic of conditions which once were more extensive is not going to melt away very soon.

Greenland is therefore a laboratory where present day scientists can be transported back thousands of years in time, to experience conditions once prevalent over the whole of Canada and the United States as far south as the Ohio River, and over a corresponding part of Europe.

Possibly the Greenland ice cap is also a forerunner of what is in store for inhabitants of Europe and North America in the not-too-distant future if, as some geologists think, we are already past the midway point of an interglacial epoch.

In addition to its arctic establishment and its highly developed low temperature laboratories in Wilmette, SIPRE has a very large field research station in northern Michigan on the Keweenaw peninsula that juts out into Lake Superior.

Cooperative Facilities Provided

Here, in an area of uniformly low winter temperatures and lots of snow, preliminary studies are made before undertaking an ambitious program in the arctic. Here also facilities are provided, on a cooperative basis, for other military agencies and industrial concerns to test out ideas for equipment for arctic use.

Here, in the old copper-mining regions, the weather stays cold long enough to get the data necessary for these tests. For 30 consecutive days, at a minimum, and on the average for 59 days, the thermometer in the dead of winter never gets above the freezing point. The Keweenaw peninsula is right in the path of the winter cold that circles down from "Medicine Hat."

The Snow, Ice and Permafrost Research Establishment, of which Dr. Gerdel heads the climatological and environmental research branch, was established in 1949 by a directive of the Research and Development Board, Department of Defense, to acquire a backlog of knowledge about snow, sea ice, lake ice, and seasonally and permanently frozen ground in the cold regions of the world.

This knowledge was to be used to aid in planning military operations and maintaining military establishments in the arctic area.

Such problems as the effect of different kinds of snow and different weather conditions on the movement of tractor trains are studied. Trains of sleds pulled by tractors take supplies to many remote stations in the far north.

The potential capacity of sea ice and lake ice for construction of landing fields for aircraft is a matter of great interest in the arctic, and SIPRE has participated in the construction of landing strips of processed snow, which has been heated and rolled to make it hard and smooth.

Intensive aerial studies are made of distribution of all types of snow, ice and frozen ground. This constitutes a part of the climate and environment phase of the Establishment's research efforts. From this information, knowledge gained in one location may be transferred to another.

Both long term and short term military planning in the arctic is thus aided.

Building on Permafrost

Permafrost areas are those where the ground areas may be frozen to a depth of a thousand feet. Only a foot or so of the surface soil melts during the summer.

Construction of a permanent building on ground of this kind requires a special foundation. If such a building is heated, the ground under it melts and the building sinks. But even if the building is not heated, it may trap the large amount of solar radiation available in the summer, and melt its way into the ground anyway.

SIPRE has carried out a number of research projects in the permafrost field that are providing information on the construction of buildings, airstrips and other structures on permafrost.

One of its important programs is measurement of solar radiation. From this measurement, a solar radiation index is computed that is used in forecasting the "trafficability" of the snow.

When the snow is very cold, more radiation from the sun means better trafficability, because warming makes cold snow more readily compacted, and so the tractors get along better because they do not bog down in the cold loose snow.

Traffic on Warm Snow

When the snow is warm, however, more radiation brings worse traffic conditions, because it makes the snow melt and coats the surface of the snow with a water film that acts as a lubricant and reduces friction of the tractor tracks on the snow.

Then arctic snow is like a winter snow during a January thaw in the temperate zones, and tractors skid as they try to pull supplies up the long ice ramp to the top of Greenland's snow cap, to the little band of hardy adventurers in the "City Under the Ice."

These young men work in the tradition of the great polar explorers of the past, braving many hardships to learn more about this big frozen desert at the top of the world. It represents man's last chance for true exploration on our crowded planet.

Science News Letter, January 21, 1956

PHYSICS

Nobel Winner Predicts Seven Heavy Elements

➤ SEVEN MORE HEAVY elements, 102 through 108, will be created in the next five to fifteen years, Dr. Glenn T. Seaborg, Nobel Laureate at the University of California and co-discoverer of plutonium, has predicted.

The most likely production method, he said, is in an atom smasher such as the one now being constructed in Berkeley with Atomic Energy Commission funds. This is the "hilac," heavy ion linear accelerator, which will speed up very heavy nuclei, like neon, with an atomic weight of 20.

By hurling relatively large nuclei into the "hearts" of heavy atoms like uranium, it should be possible to build up the heavier elements. With lighter atomic bullets, the scientists have produced elements up to 101, discovered earlier this year.

Dr. Seaborg says elements 102 through 105 should be stable enough to identify chemically. Elements 106 through 108 probably will decay so rapidly they can be analyzed only from their radioactivity.

Science News Letter, January 21, 1956

Why Wash Your Car?

Hear neighbors ask how you keep your car so shiny clean! Wipe off DRY on nice days with $2 KozaK Auto DRY Wash Cloth. Takes only minutes. Hose-wash only 2-3 times year if at all. KozaK safely wipes even dirtiest cars to proud beauty, higher trade-ins. Used for 30 years by over 10 million careful buyers like Cadillac owners. Guaranteed safe, easy, or money back. Let $2 return you fifty in car-wash savings! Sold direct to you. Mail coupon now.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase at any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Serivce.

THE ATOMIC NUCLEUS—Robley D. Evans—*McGraw-Hill*, 972 p., illus., $14.50. A standard text in fundamental nuclear physics for college graduate students.

CYBERNETICS: Circular Causal and Feedback Mechanisms in Biological and Social Systems—Heinz Von Foerster, Ed.—*Josiah Macy, Jr. Foundation*, 100 p., illus., $2.75. Transactions of a conference held in Princeton, N. J., April, 1953.

HIGHWAY RESEARCH BOARD: Proceedings of the Thirty-Fourth Annual Meeting, Washington, D. C., January 11-14, 1955—Fred Burggraf, Elmer M. Ward and Walter J. Miller, Eds.—*Highway Research Board*, 648 p., illus., $8.50.

INFRARED AND ULTRAVIOLET PHOTOGRAPHY—*Eastman Kodak Co.*, revised ed., 48 p., illus., paper, 50 cents. This edition has been expanded to include sections on infrared motion picture photography and on new ultraviolet light sources.

AN INTRODUCTION TO BOTANY—Arthur W. Haupt—*McGraw-Hill*, 3rd ed., 447 p., illus., $5.50. Basic facts and principles concerning plants that are essential to an understanding of their structure, functions, life relations and evolution.

IONIZED GASES—A. von Engel—*Oxford University Press*, 281 p., illus., $6.75. Emphasizing fundamental concepts and limitations of the various treatments.

THE NEW BASIC SCIENCE—J. Darrell Barnard and Lon Edwards—*Macmillan*, 632 p., illus., $4.20. A revision of the textbook, *Basic Science*, introducing science to young people.

OXFORD HOME ATLAS OF THE WORLD: Being the Oxford School Atlas in a General Edition—Prepared by the Cartographic Department of the Clarendon Press—*Oxford University Press*, 135 p., illus., $2.40. A new technique portrays mountains and other physical features in a three-dimensional effect. A handy size for your desk or home library.

PERSONAL INFLUENCE: The Part Played by People in the Flow of Mass Communications—Elihu Katz and Paul F. Lazarsfeld—*Free Press*, 400 p., $6.00. A report of the Bureau of Applied Social Research, Columbia University, which points out the fact that personal influence is, at times, more significant than influences stemming from the mass media.

PRINCIPLES OF PHYSICAL METALLURGY—Morton C. Smith—*Harper*, 417 p., illus., $6.00. To help the metallurgist develop a fundamental understanding of metal behavior and a real facility in using the reference literature of his science.

THE ROCKEFELLER FOUNDATION ANNUAL REPORT, 1954—Dean Rusk, president—*Rockefeller Foundation*, 439 p., illus., paper, free upon request direct to publisher, 49 West 49th St., New York, N. Y. Reporting the expenditure of $19,107,665, of which over five million dollars was devoted to work in medicine and public health.

SCIENCE AND ENGINEERING IN AMERICAN INDUSTRY: Preliminary Report on a Survey of Research and Development Costs and Personnel in 1953-1954—Prepared for the National Science Foundation by the U. S. Department of Labor, Bureau of Labor Statistics—*Govt. Printing Office*, 41 p., paper, 30 cents. The survey of research and development in private industry, on which this is a preliminary report, was initiated by the National Science Foundation to provide information needed in developing and recommending policies to strengthen the nation's scientific research effort.

SCIENCE AND MODERN LIFE—Sir E. John Russell—*Philosophical Library*, 101 p., $2.75. Discussing problems arising out of the impact of science and technology on daily life, for the solution of which, according to the author, science alone is insufficient.

THE SCIENCE IN ACTION TV LIBRARY: Volume I—Benjamin Draper, Ed.—*California Academy of Sciences* and *Merlin Press*, 157 p., illus., $3.50. Containing scripts of the TV program "Science in Action" produced by the California Academy of Sciences, and including a discussion of production problems of this type of program.

TRAVELS AND TRADITIONS OF WATERFOWL—H. Albert Hochbaum—*University of Minnesota Press*, 301 p., illus., $5.00. Presenting the author's views on the "tradition" aspect of migration, as well as a review of much of the literature, and questioning some of the theories currently held.

WHAT CAN HAPPEN TO PLUMBING: And How to Prevent It—*National Association of Plumbing Contractors*, 18 p., illus., paper, single copies free from request direct to publisher, 1016 20th St., N. W., Washington 6, D. C. Clearly illustrated directions for first aid to ailing plumbing and also explanations of what can go wrong that you should not attempt to fix yourself.

WORLD COMMERCE AND GOVERNMENTS: Trends and Outlook—W. S. Woytinsky and E. S. Woytinsky—*Twentieth Century Fund*, 907 p., illus., $10.00. Outlining the current changes in commerce, especially foreign trade, transportation, and the political and financial organization of nations. A companion report to the study of *World Population and Production*. (See SNL, Nov. 28, 1953, p. 348.)

YOU AND THE ATOM—Gerald Wendt with a preface by Luther H. Evans—*Whiteside*, 95 p., illus., $1.95. Telling of the beneficial and constructive uses of the atom-for-peace and of the prospects for the future. Originally published by UNESCO under title *Nuclear Energy and Its Uses in Peace*. (See SNL, Sept. 10, 1955, p. 172.)

Science News Letter, January 21, 1956

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WILDLIFE

Census Taken of Wintering Waterfowl

➤ THE U. S. GOVERNMENT has finished counting heads in another census.

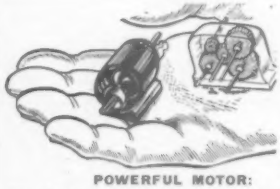
The count was the annual winter inventory of migratory waterfowl involving a survey from ground and air in every known wintering area from southern Canada to southern Mexico. More than 2,200 state and federal experts helped to make the survey, using 146 airplanes for aerial observation as well as the vehicles employed in the ground survey.

The planes fly low enough to determine the species of birds seen, but not low enough to frighten them, the U. S. Fish and Wildlife Service reports. Since waterfowl do very little moving around in midwinter, the chances of counting the same birds in more than one place are considered small.

The annual survey is of considerable value in showing the winter distribution of waterfowl and shifts in their location from the effects of land and water management, the FWS said. Information gathered from the surveys shows numerical trends in waterfowl population and indicates what steps need to be taken in management as changes are noted.

The survey, conducted from Jan. 3 to 16, was the eighth "comparable" winter census in a row.

Science News Letter, January 21, 1956



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METALLURGY

Zirconium Produced

➤ A NEW METAL "with the bright atomic future," zirconium, has graduated from laboratory oddity to large-scale commercial production, following ten years of intensive research and experimentation, the U. S. Bureau of Mines revealed.

Zirconium's properties make it a desirable construction material in the field of nuclear energy, the Bureau reported. Almost as strong as steel, but lighter, it is resistant to corrosion and has an extremely high melting point of 3,350 degrees Fahrenheit. (Most grades of steel melt below 2,800 degrees Fahrenheit.)

It is used in building atomic ovens, since it does not absorb and thus waste neutrons needed to sustain a chain reaction. The metal was a vital material in the power plant of the first atomic submarine, the Nautilus.

Until 1954 the Bureau of Mines was the principal supplier of zirconium used by the Atomic Energy Commission and the Navy Department's Bureau of Ships. Now the Bureau has handed the production job over to private industry and is working on research aimed at increasing zirconium's usefulness, according to the report.

Commercial production of the metal began in 1945, using a technique developed by Dr. William J. Kroll, a metallurgist who escaped to this country from his native Luxembourg before the Nazi invasion. In this process, molten magnesium is used to "win" the pure metal from the compounds it is found in naturally.

Zirconium absorbs impurities from the air, so that extracting and melting it must be carried out in a vacuum. It is "temperamental," and will burst into flame during certain stages of production unless handled carefully.

In 1948, when the AEC became interested in the metal, there was one pilot plant already operating capable of producing 3,000 pounds of sponge metal a year. Later, that Bureau-operated plant came to produce more than 280,000 pounds of zirconium a year.

Science News Letter, January 21, 1956

ORNITHOLOGY

Case of the Dying Birds

➤ IT TOOK techniques more normal to Scotland Yard than a wildlife agency to solve the mystery of the dying goldfinches. But experts with the California Department of Fish and Game in Sacramento found the death cause: poisoning by cyanide.

The fish and game department was called on the case when a report came in that hundreds of birds were dead in a residential area of the Sacramento Valley. Checking the scene of the deaths, Ernest Clark of the department noted a nearby grove of almond trees from which the birds, American goldfinches, were feeding.

He gathered a few of the partly eaten almonds and took them to the laboratory of Dr. Stuart A. Peoples of the University of California at Davis. Analysis revealed that the almonds had a cyanide content of approximately 0.2 milligram per nut.

As a check, the chemical amylnitrite, a specific antidote for cyanide poisoning, was administered to several birds just after they were seen to fall. The effect was spectacular. When treated, the apparently lifeless birds came to, shook their heads, and in about three minutes were able to fly again.

According to the report made in the journal, the *Condor* (Nov.-Dec.), by Wallace C. Macgregor of the fish and game department, almonds contain chemicals that react in the presence of water to form hydrocyanic acid, along with other by-products. This is evidently what happened in the almonds that killed the goldfinches, Mr. Macgregor said.

Humans have little to worry about this kind of poisoning, unless they eat pounds and pounds of water-logged almonds.

Science News Letter, January 21, 1956

In England, rubber technicians have developed *rubber tires* for trains.

The 1955 average of world *crude oil* production was more than 15,000,000 barrels daily.

● RADIO

Saturday, Jan. 28, 1956, 2:05-2:15 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. W. A. Baum, staff member, Mt. Wilson and Palomar Observatories in California, will discuss "Probing Farther Into Space."

PUBLIC HEALTH

Survey World's Facilities For Treating Tuberculosis

➤ A WORLD-WIDE SURVEY of facilities for treating tuberculosis has been completed by Dr. John D. Steele of the Veterans Administration Hospital, San Fernando, Calif.

Of 30 countries surveyed, he found an adequate or more than adequate number of hospital beds in Great Britain, Ireland, Holland and Switzerland.

An "almost adequate" number of beds to care for TB patients were found in Finland, Belgium, West Germany, Poland, Spain, Portugal, New Zealand, Trinidad, Peru, Uruguay and Chile.

Inadequate beds were reported for Jordan, Egypt, Iraq, Burma, Malaya, Indonesia, South China, Formosa, Japan, Mexico, Jamaica, Costa Rica, Panama, Paraguay and Argentina.

Dr. Steele, former president of the American Trudeau Society, conducted the survey with aid of correspondents in each of the 30 countries surveyed.

A Russian correspondent said that "under the single government system of medical aid in the U.S.S.R., the number of beds allotted to any given form of the disease is governed by the necessity of the moment. In case an excess of beds exists for a given form of tuberculosis, the excess is then assigned to the type of tuberculosis in which there is a lack of beds."

Science News Letter, January 21, 1956

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⚙ *PRESSURE-CONTACT ADHESIVE made for spray applications is available for professional brush or trowel use, and for do-it-yourself use requiring only a trowel. Water resistant, the pressure-contact adhesive eliminates conventional bonding methods that need weights, presses or clamps.*

Science News Letter, January 21, 1956

⚙ *READING AID for those with poor vision is the result of five years of research. The magnifier is an optical instrument that projects a three- or five-times enlarged image of reading material on its built-in illuminated screen.*

Science News Letter, January 21, 1956

⚙ *THREE-WAY Air Conditioner is described as not only a cooler and ventilator, but an electronic germ killer. The bacteria-killing mechanism of the conditioner can be operated while cooling, ventilating or independently all year around.*

Science News Letter, January 21, 1956

⚙ *PLASTIC GREENHOUSE can be made inexpensively and quickly with polyethylene plastic film tacked onto wood frames, as shown in the photograph. A double layer of the film transmits 90% of the sunlight*

that will go through glass. The plastic will resist rain, snow, hail and the acids and alkalies from fungicides.

Science News Letter, January 21, 1956

⚙ *PLASTIC BUCKET for the busy housewife is virtually unbreakable. Molded of polyethylene plastic, the ten-quart bucket has a strong chrome-plated handle and a reinforced rim. It is available in red, yellow or pink.*

Science News Letter, January 21, 1956

⚙ *SOLDERING IRON made in England is designed for heavier work. The eight-pound tool reaches maximum heat in five minutes and offers a choice of three interchangeable copper bits, pointed, hatchet or chisel. It can be used to solder aluminum.*

Science News Letter, January 21, 1956

⚙ *LIGHTWEIGHT CONCRETE is described as strong, self-insulating and highly moisture resistant. The new concrete is compounded of a liquid foaming agent and a water soluble plastic agent. When used with wet concrete and especially mixed, the result is a cellular structure.*

Science News Letter, January 21, 1956

⚙ *SCREW GAUGE and round stock calibrator is a combination tool for craftsmen. The gauge will calibrate all sizes of both machine and wood screws from #0 to #14. It also has a calibrated scale by 32nds for all types of round stock.*

Science News Letter, January 21, 1956

Looking for a science project to exhibit in your area's science fair?

THOUSANDS OF SCIENCE PROJECTS

is just what the title indicates. Under a grant from the National Science Foundation, Science Service produced the booklet, listing many projects of students entering the National Science Fair and the Annual Science Talent Search programs. Library of Congress system of classification used to give information and arrangement.

Work *from* these listings, using the booklet for suggestions in pursuing your own ideas. Strive for your *own* interpretation of science problems.

For ideas, for illustrations of projects that have been shown in both fairs and searches, write for

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Do You Know?

Experimental success with a newly discovered nematode-borne disease that kills many kinds of *insect pests* has been disclosed by the U. S. Department of Agriculture.

Sound waves are proving useful in the production of more perfect mixes and emulsions of food.

The most effective way to prevent *rabbit* damage to trees and shrubs is to paint and spray them with chemical repellents.

Prof. Wilhelm Conrad Roentgen discovered *X-rays* on Nov. 8, 1895.

Expenditure for *scientific research* in the U. S. during 1955 is estimated at $4,100,000,000.

The first atomic bomb explosion in 1945 gave evidence of two types of *earthwaves* that are not found in earthquakes.

The atomic propulsion plant of the *submarine*, U.S.S. Nautilus, supplies power equivalent to the electricity consumed by a city of 20,000.